

CLAIMS

What is claimed is:

- 1 1. In an apparatus, a method of operation comprising:
2 a basic input/output system (BIOS) intervening in a suspend process
3 initiated in response to an AC failure condition of the apparatus, to place the
4 apparatus in a suspended to memory state, sustained by backup power;
5 the BIOS initiating as part of the intervention, a plurality of data transfer
6 operations to transfer at least selected contents in a memory of the apparatus to
7 a persistent store to save a persistent copy of an operational state of the
8 apparatus;
9 the BIOS further checking as part of the intervention, one or more times to
10 determine whether the data transfer operations are completed; and
11 the BIOS further causing as part of the intervention, at least a processor of
12 the apparatus to operate in a reduced power consumption mode in at least one
13 time period while the BIOS is not performing said checking.
- 1 2. The method of claim 1, wherein said causing of at least a processor of the
2 apparatus to operate in a reduced power consumption mode for at least one time
3 period while the BIOS is not performing said checking, comprises the BIOS
4 causing a processor of the apparatus to be at least halted for a first time period
5 while the BIOS is not performing said checking.
- 1 3. The method of claim 2, wherein said causing of a processor of the
2 apparatus to be at least halted for a first time period while the BIOS is not
3 performing said checking, comprises the BIOS causing a processor of the

4 apparatus to enter an ACPI C1 state for the first time period while the BIOS is not
5 performing said checking.

1 4. The method of claim 2, wherein said causing of a processor of the
2 apparatus to be at least halted for a first time period while the BIOS is not
3 performing said checking, comprises the BIOS causing a processor of the
4 apparatus to enter a selected one of an ACPI C2 state and an ACPI C3 state for
5 the first time period while the BIOS is not performing said checking.

1 5. The method of claim 2, wherein said causing of a processor of the
2 apparatus to be at least halted for a first time period while the BIOS is not
3 performing said checking, is performed after the BIOS initiated the data transfer
4 operations.

1 6. The method of claim 2, wherein said causing of a processor of the
2 apparatus to be at least halted for a first time period while the BIOS is not
3 performing said checking, is performed after the BIOS determined as part of a
4 checking that the data transfer operations are still in progress.

1 7. The method of claim 2, wherein said causing of at least a processor of the
2 apparatus to operate in a reduced power consumption mode for at least one time
3 period while the BIOS is not performing said checking, further comprises the
4 BIOS setting a timer to expire at the end of the first time period to interrupt the
5 processor, causing the processor to exit the reduced power consumption mode
6 of operation.

- 1 8. The method of claim 1, wherein said checking comprises the BIOS
2 checking a plurality of times to determine whether the data transfer operations
3 are completed.
- 1 9. The method of claim 1, wherein said causing comprises the BIOS causing
2 at least a processor of the apparatus to operate in a reduced power consumption
3 mode in a plurality of time periods while the BIOS is not performing said
4 checking.
- 1 10. The method of claim 1, wherein the method further comprises the BIOS
2 marking the persistent copy of the operational state of the apparatus as valid,
3 upon completion of the data transfer operations.
- 1 11. The method of claim 1, wherein the method further comprises the BIOS
2 configuring as part of the intervention, one or more wake events as ineligible to
3 wake the apparatus after the apparatus enters the suspended to memory state,
4 leaving AC re-availability as the only wake event eligible to wake the apparatus
5 from the suspended to memory state.
- 1 12. The method of claim 1, wherein the method further comprises the BIOS
2 causing the suspend process to be completed subsequent to the completion of
3 the data transfer operations.
- 1 13. In an apparatus, a method of operation comprising:
2 a basic input/output system (BIOS) commencing a cold start reset process
3 on re-application of AC power to the apparatus while the apparatus is in an un-
4 powered state;

5 the BIOS determining as part of the cold start reset process, whether a
6 persistent storage of the apparatus comprises a valid saved operational state of
7 the apparatus;

8 the BIOS re-marking the valid saved operational state of the apparatus as
9 invalid, if the persistent storage is determined to have a valid saved operational
10 state of the apparatus; and

11 the BIOS initiating a plurality of data transfer operations to transfer the
12 saved operational state of the apparatus from the persistent storage to a memory
13 of the apparatus to restore the saved operational state of the apparatus from the
14 persistent storage to a memory of the apparatus.

1 14. The method of claim 13, wherein the method further comprises on
2 completion of the data transfer operations, the BIOS setting up an immediate
3 wake event to immediately wake the apparatus, and placing the apparatus in a
4 suspended to memory state, resulting in the set up immediate wake event to
5 immediately wake the apparatus to cause the cold start reset process to be
6 continued as a resume process, eventually leading to the apparatus to start
7 operation in an active state, continuing from the restored operational state of the
8 apparatus.

1 15. The method of claim 13, wherein the method further comprises continuing
2 with the cold start reset process, upon determining the persistent storage not
3 comprising a valid saved operational state of the apparatus.

1 16. A system comprising:
2 a memory to store at least a current operational state of the system;
3 a persistent storage;

4 a processor; and
5 a basic I/O system (BIOS) operatively coupled to the memory, the
6 persistent storage and the processor, to intervene in a suspend process to
7 suspend the system to a suspended to memory state in response to an AC
8 failure condition of the system, and save a persistent copy of the operational
9 state of the system in the persistent storage, including
10 initiating a plurality of data transfer operations to copy the operational
11 state into the persistent storage;
12 checking as part of the intervention, one or more times to determine
13 whether the data transfer operations are completed, and
14 causing as part of the intervention, at least the processor to operate in
15 a reduced power consumption mode in at least one time period
16 while the BIOS is not performing said checking.

1 17. The system of claim 16, wherein the BIOS causes at least the processor
2 to operate in a reduced power consumption mode for at least one time period
3 while the BIOS is not performing said checking, by causing the processor *to be* at
4 least halted for a first time period while the BIOS is not performing said checking.

1 18. The system of claim 17, wherein the BIOS causes the processor to be at
2 least halted for a first time period while the BIOS is not performing said checking,
3 by causing the processor to enter an ACPI C1 state for the first time period while
4 the BIOS is not performing said checking.

1 19. The system of claim 17, wherein the BIOS causes the processor to be at
2 least halted for a first time period while the BIOS is not performing said checking,
3 by causing the processor to enter a selected one of an ACPI C2 state and an

4 ACPI C3 state for the first time period while the BIOS is not performing said
5 checking.

1 20. The system of claim 17, wherein the BIOS causes the processor to be at
2 least halted for a first time period while the BIOS is not performing said checking,
3 after the BIOS initiated the data transfer operations.

1 21. The system of claim 17, wherein the BIOS causes the processor to be at
2 least halted for a first time period while the BIOS is not performing said checking,
3 after the BIOS determined as part of a checking that the data transfer operations
4 are still in progress.

1 22. The system of claim 17, wherein the BIOS causes at least the processor
2 to operate in a reduced power consumption mode for at least one time period
3 while the BIOS is not performing said checking, by further setting a timer to
4 *expire* at the end of the first time period to interrupt the processor, causing the
5 processor to exit the reduced power consumption mode of operation.

1 23. The system of claim 16, wherein the BIOS checks to determine whether
2 the data transfer operations are completed a plurality of times.

1 24. The system of claim 16, wherein the BIOS causes at least a processor of
2 the apparatus to operate in a reduced power consumption mode while the BIOS
3 is not performing said checking, in a plurality of time periods.

1 25. The system of claim 16, wherein the BIOS further marks the saved copy of
2 the operational state of the apparatus as valid, upon completion of the data
3 transfer operations.

1 26. The system of claim 16, wherein the BIOS further configures as part of the
2 intervention, one or more wake events as ineligible to wake the apparatus after
3 the apparatus enters the suspended to memory state, leaving AC re-availability
4 as the only wake event eligible to wake the apparatus from the suspended to
5 memory state.

1 27. The system of claim 16, wherein the BIOS further causes the suspend
2 process to be completed subsequent to the completion of the data transfer
3 operations.

1 28. The system of claim 16, wherein the system further comprises a
2 networking interface operatively coupled to the BIOS.

1 29. The system of claim 16, wherein the system is a selected one of a set-top
2 box, an entertainment control console, a video recorder, and a video player.

1 30. A system comprising:
2 a memory;
3 a persistent storage to store at least a saved operational state of the
4 system; and
5 a basic I/O system (BIOS) equipped to be operationally coupled to the
6 memory and the persistent storage, to determine, as part of a cold start reset
7 process commenced in response to re-application of AC power to the system
8 while the system is in an un-powered state, whether the persistent storage
9 comprises a valid saved operational state of the system, and to mark the valid
10 saved operational state of the system as invalid upon determining existence of

11 the valid saved operational state of the system in the persistent storage, before
12 or substantially concurrent with commencing restoration of the saved operational
13 state of the system from the persistent storage to the memory.

1 31. The system of claim 30, where the BIOS is further equipped to
2 initiate a plurality of data transfer operations to restore the saved
3 operational state of the system from the persistent storage to the memory, and
4 on completion of the data transfer operations, set up a wake event to
5 wake the system, and place the system in a suspended to memory state,
6 resulting in the set up wake event to immediately wake the system to cause the
7 cold start reset process to continue as a resume process, eventually leading to
8 the system to start operation in an active state, continuing from the restored
9 operational state of the system.

1 32. The system of claim 30, wherein the BIOS is further designed to continue
2 the cold start reset process, upon determining the persistent storage not
3 comprising a valid saved operational state of the system.

1 33. The system of claim 30, wherein the system further comprises a
2 networking interface operatively coupled to the BIOS.

1 34. An article of manufacture comprising:
2 a storage medium; and
3 a plurality of programming instructions stored therein, implementing a
4 basic I/O system (BIOS) with the ability to intervene in a suspend process
5 initiated in response to an AC failure condition of an apparatus to suspend the

6 apparatus hosting the BIOS to a suspended to memory state, and save a
7 persistent copy of an operational state of the apparatus, including
8 initiating a plurality of data transfer operations to transfer at least
9 selected contents of a memory of the apparatus to a persistent
10 storage of the apparatus;
11 checking as part of the intervention, one or more times to determine
12 whether the data transfer operations are completed, and
13 causing as part of the intervention, at least a processor of the
14 apparatus to operate in a reduced power consumption mode in at
15 least one time period while the BIOS is not performing said
16 checking.

1 35. The article of claim 34, wherein the BIOS is further equipped to *mark* the
2 persistent copy of the operational state of the apparatus as valid, upon
3 completion of the data transfer operations.

1 36. The article of claim 34, wherein the BIOS is further equipped to configure
2 as part of the intervention, one or more wake events as ineligible to wake the
3 apparatus after the apparatus enters the suspended to memory state, leaving AC
4 re-availability as the only wake event eligible to wake the apparatus from the
5 suspended to memory state.

1 37. The article of claim 34, wherein the BIOS is further equipped to cause the
2 suspend process to be completed subsequent to the completion of the data
3 transfer operations.

1 38. An article of manufacture comprising:

2 a storage medium;
3 a plurality of programming instructions stored therein, implementing a
4 basic I/O system (BIOS) equipped to
5 determine as part of a cold start reset process of an apparatus initiated
6 in response to re-application of AC to the apparatus while the
7 apparatus is in an un-powered state, whether a persistent storage
8 of the apparatus comprises a valid saved operational state of the
9 apparatus, and
10 marking the valid saved operational state of the apparatus as invalid
11 before or substantially concurrent with commencing restoration of
12 the saved operational state of the apparatus from the persistent
13 storage to a memory of the apparatus.

1 39. The article of claim 38, where the BIOS is further equipped to
2 initiate a plurality of data transfer operations to restore the saved
3 operational state of the system from the persistent storage to the memory, and
4 on completion of the data transfer operations, set up a wake event to
5 wake the system, and place the system in a suspended to memory state,
6 resulting in the set up wake event to immediately wake the system to cause the
7 cold start reset process to continue as a resume process, eventually leading to
8 the system to start operation in an active state, continuing from the restored
9 operational state of the system.

1 40. The article of claim 38, wherein the BIOS are further designed to continue
2 and complete the cold start and reset process, after the persistent storage is
3 determined not to comprise a saved operational state of the apparatus.